

Work Order ID 70650

Friday, June 10, 2011 3:58:01 PM



Page 1

Item ID: D350-748-141TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Turning Detail

Start Date: 6/10/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 6/22/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr

Revision Nbr

D350-748-141

Rev F

11/08/22

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA648
2-Turn first side as per Folio FA648
3- File transition lines smooth.

11/08/19

110

0.00



QC1- Inspect dimensions to dimension sheet

QC

Memo

0.00

Quality Control

11/08/22 1 0

120

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA648
2- File transition lines smooth.
3-Scribe Part & Batch as per Dwg D350-748-141

11/08/22 1 0

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 70650

Friday, June 10, 2011 3:58:01 PM



Page 2

Item ID: D350-748-141TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Turning Detail

Start Date: 6/10/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 6/22/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 QC Quality Control	QC1- Inspect dimensions to dimension sheet Memo	0.00 0.00				1	0		
140 QC Quality Control	QC8- Inspect parts - second check Memo	0.00 0.00				1	0		
150 Crosstubes Crosstubes	Large Fab Memo Grind machining marks	0.00 0.00				1			

DF2 / max 11/08/22

B.A 11/08/22

SAD 11-08-22

①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

[illegible]

Page 3

[illegible][illegible][illegible]

Age	18-24
Gender	Male
Marital status	Married
Education	High school
Occupation	Student
Religion	Islam
Income	Low
Health status	Good
Family size	Small
Urban/rural	Urban
Time of day	Daytime
Season	Summer
Weather	Sunny
Location	City center
Time of year	Spring
Month	March
Day of week	Monday
Time of day	Evening
Season	Winter
Weather	Cloudy
Location	Suburb
Time of year	Autumn
Month	October
Day of week	Friday
Time of day	Morning
Season	Spring
Weather	Windy
Location	Rural
Time of year	Summer
Month	July
Day of week	Saturday
Time of day	Afternoon
Season	Autumn
Weather	Rainy
Location	City center
Time of year	Winter
Month	December
Day of week	Sunday
Time of day	Evening
Season	Spring
Weather	Sunny
Location	Suburb
Time of year	Summer
Month	August
Day of week	Monday
Time of day	Morning
Season	Autumn
Weather	Cloudy
Location	Rural
Time of year	Winter
Month	January
Day of week	Tuesday
Time of day	Afternoon
Season	Spring
Weather	Windy
Location	City center
Time of year	Summer
Month	June
Day of week	Wednesday
Time of day	Morning
Season	Autumn
Weather	Rainy
Location	Suburb
Time of year	Winter
Month	February
Day of week	Thursday
Time of day	Evening
Season	Spring
Weather	Sunny
Location	Rural
Time of year	Summer
Month	May
Day of week	Friday
Time of day	Afternoon
Season	Autumn
Weather	Cloudy
Location	City center
Time of year	Winter
Month	November
Day of week	Saturday
Time of day	Morning
Season	Spring
Weather	Windy
Location	Suburb
Time of year	Summer
Month	April
Day of week	Sunday
Time of day	Evening
Season	Autumn
Weather	Rainy
Location	Rural
Time of year	Winter
Month	March
Day of week	Monday
Time of day	Morning
Season	Spring
Weather	Sunny
Location	City center
Time of year	Summer
Month	July
Day of week	Tuesday
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Location	Suburb
Time of year	Winter
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Weather	Windy
Location	Rural
Time of year	Summer
Month	August
Day of week	Thursday
Time of day	Evening
Season	Autumn
Weather	Rainy
Location	City center
Time of year	Winter
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Location	Rural
Time of year	Winter
Month	February
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Time of day	Evening
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Location	City center
Time of year	Summer
Month	May
Day of week	Monday
Time of day	Morning
Season	Autumn
Weather	Rainy
Location	Suburb
Time of year	Winter
Month	November
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Location	Suburb
Time of year	Summer
Month	July
Day of week	Friday
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Season	Autumn
Weather	Rainy
Location	Rural
Time of year	Winter
Month	January
Day of week	Saturday
Time of day	Afternoon
Season	Spring
Weather	Sunny
Location	City center
Time of year	Summer
Month	June

[illegible]

Reference:

[illegible]

**Insp.
Stamp**

[illegible]

Outsource process - Heat Treat

Heat Treat to min 180 KSI As per Dwg D350-748-141
(MIL-T-6736 OR AMS 2759-1C)
Sand Blast tube after Heat Treat
Possible Supplier: Vac Aero
Ensure Certificate of Conformity is attached

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Quality Control

8/10/20

CL 11/08/24 ①

Page 26 (1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 70650

Friday, June 10, 2011 3:58:01 PM

Page 4

Item ID: D350-748-141TRN

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Turning Detail

Start Date: 6/10/2011 Start Qty: 1.00

Cust Item ID:

Required Date: 6/22/2011 Req'd Qty: 1.00

Customer:



Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190 	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and stock in kanban rack Location: <u>Back Hall</u>								
			<i>mm.L</i>	<i>11/09/26</i>					
200 	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

*u/9/27**ME*
11-09-27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Friday, June 10, 2011 3:58:07 PM

Page 1

Work Order ID: 70650



Parent Item: D350-748-141TRN



Parent Item Name: Crosstube Turning Detail


Start Date: 6/10/2011

Required Date: 6/22/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
IPP Rev B Removed polish 08.04.02 EC verified by : DD
IPP Rev C Remove LPS-3 08.06.23 EC verified by DD IPP Rev C
11.02.24 as per dwg rev.F DD verf: JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6015-125 		Manufactured	No			110	Each	53.0000	1	1			
Crosstube Material													

Location

Loc Qty

Loc Code

HALL

53

61380

53

1 gmm, L 11/08/19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order: 70650
Description: Crosstube Assembly (AS350/355 High Fwd)	Part Number: D350-748-141
Inspection Dwg: D350-748-141 Rev: E	Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.243"	✓		mirc	CNC-04
	2.180	+0.005/-0.000	2.183"	✓		"	
	2.180	+0.005/-0.000	2.184"	✓		"	
	2.237	+0.005/-0.000	2.242"	✓		"	
	2.272	+0.005/-0.000	2.277"	✓		"	
	2.306	+0.005/-0.000	2.310"	✓		"	
	2.339	+0.005/-0.000	2.342"	✓		"	
	2.339	+0.005/-0.000	2.346	✓		"	
	0.062	+/-0.010	.062	✓		vern	JF-01
	4.26	+/-0.030	4.271	✓		"	
	R0.063	+/-0.010	.063	✓		RG	Ref.
	R0.50	+/-0.030	R0.500	✓		"	" "
SIDE B	2.240	+0.005/-0.000	2.243	✓		mirc	CNC-04
	2.180	+0.005/-0.000	2.183	✓		"	
	2.180	+0.005/-0.000	2.184	✓		"	
	2.237	+0.005/-0.000	2.241	✓		"	
	2.272	+0.005/-0.000	2.276	✓		"	
	2.306	+0.005/-0.000	2.310	✓		"	
	2.339	+0.005/-0.000	2.349	✓		"	
	2.339	+0.005/-0.000	2.346	✓		"	
	0.062	+/-0.010	.062	✓		vern	JF-01
	4.26	+/-0.030				"	
	R0.063	+/-0.010	.063	✓		RG	Ref.
	R0.50	+/-0.030	.500			"	" "
	110.27	+/-0.060	110.26	✓		tape	MM-L-02

Measured by: M.M. L. 11/08/19	Audited by: B.A.	Preliminary Approval:
Date: 11/08/19	Date: 11/08/22	Date:

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	
C	11.01.20	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AEIS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

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WORK ORDER

NO. 10650

PH-06-13

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2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D350-748-141	SHEET 1 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR TRANSMITTED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

8 7 6 5 4 3 2 1

D

C

B

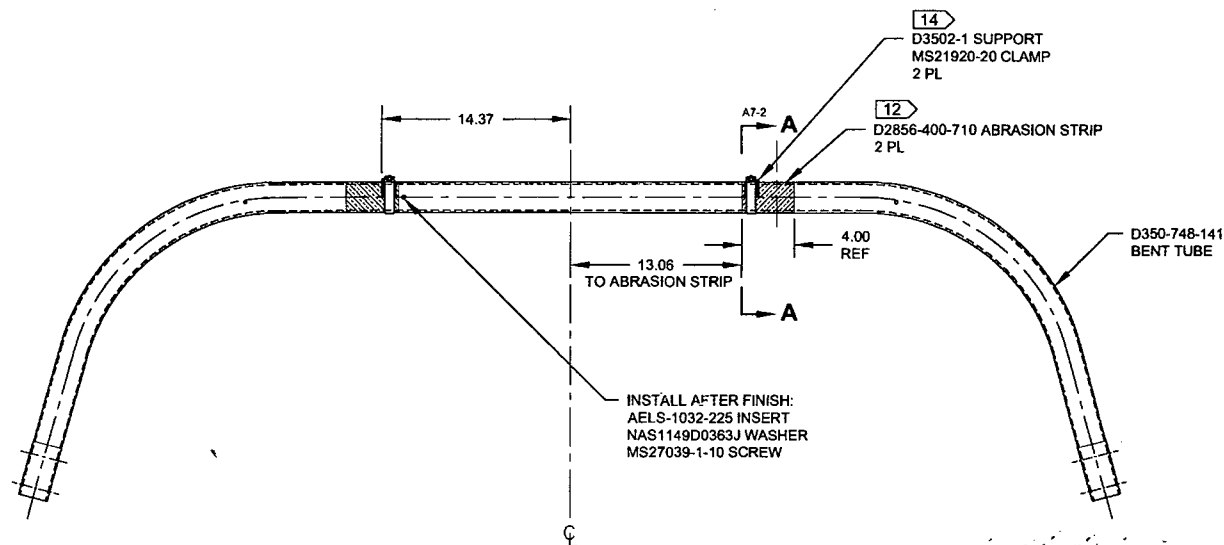
A

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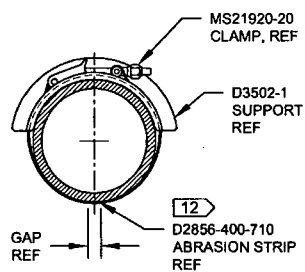
C

B

A



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

u/o 70650

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2011-01-18

DESIGN	92	DART AEROSPACE LTD	
DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.	12	D350-748-141	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
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8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

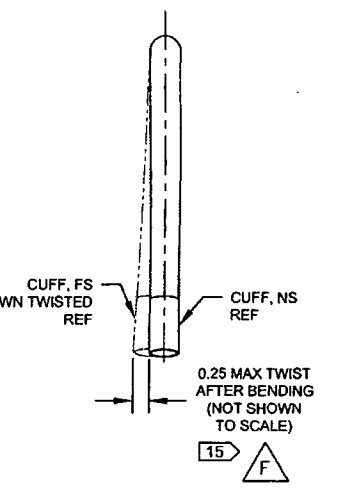
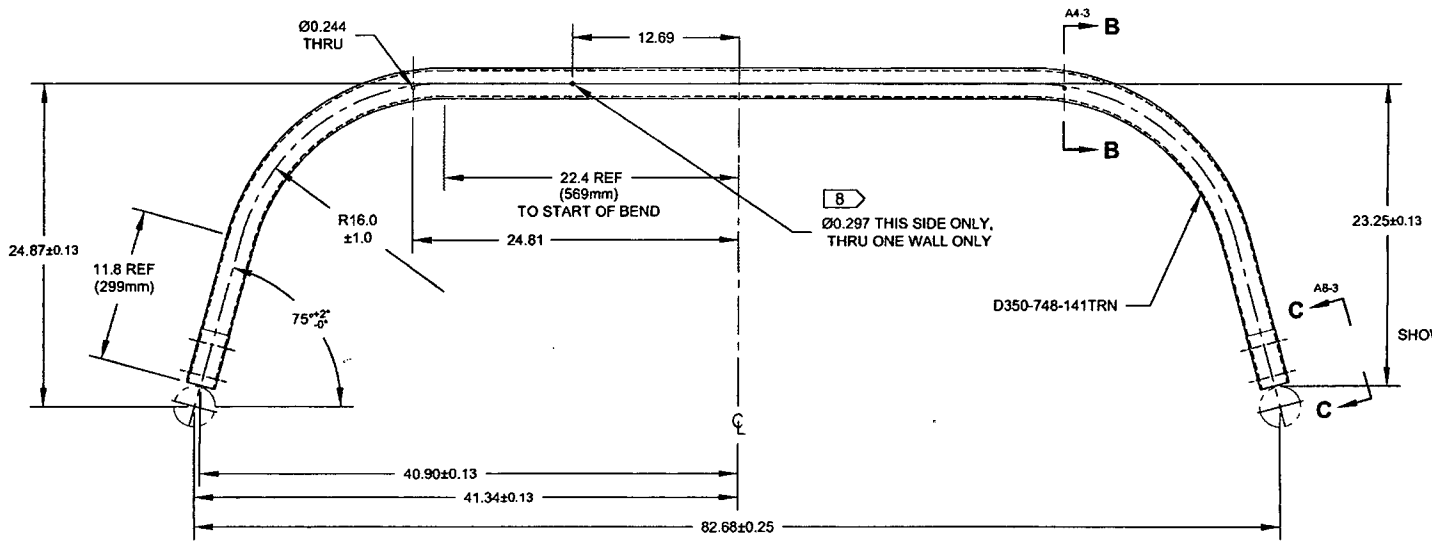
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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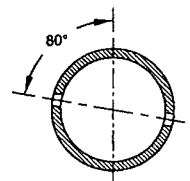
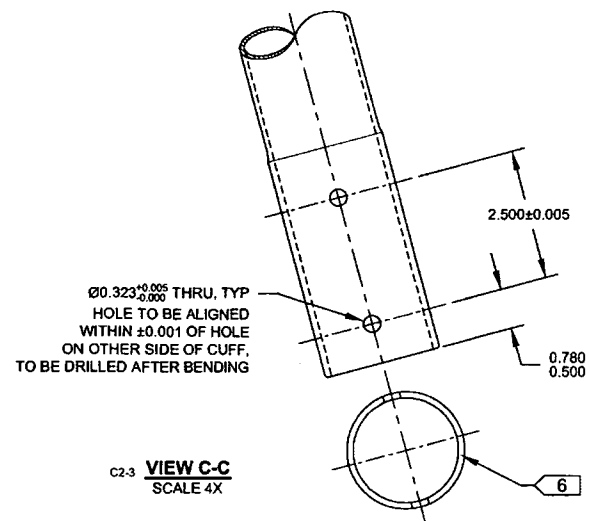
NOTE: Date & initial all entries

8 7 6 5 4 3 2 1



D350-748-141
BENDING AND DRILLING DETAIL 10

u/070650



VIEW C-C
SCALE 4X

SECTION B-B D3-3
SCALE 4X

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DESIGN	<i>97</i>	DART AEROSPACE LTD	
DRAWN	<i>97</i>	HAWKESBURY, ONTARIO, CANADA	
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MFG. APPR.	<i>h</i>		SHEET 3 OF 4
APPROVED	<i>h</i>	TITLE	SCALE
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NOTE: Date & initial all entries



VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No.: R105468102

OAK 133773-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
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CANADA L6L 6J4
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QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

09/22/2011

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PAGE: 1

1DAR01

BILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
09/22/2011		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
P014727		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141 CROSS TUBE	EA	12	12	
<p>Process Specifications: Procedure: 4353 HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1E 100% HARDNESS CHECKED AS PER ASTM E-18 40/45 HRC MATERIAL: 4130</p> <p>LINE# 70650, 1 PC LINE# 70652, 1 PC LINE# 72334, 1 PC LINE# 72335, 1 PC LINE# 72336, 1 PC LINE# 72337, 1 PC</p> <p>LINE# 72812, 1 PC LINE# 72813, 1 PC LINE# 72814, 1 PC LINE# 72815, 1 PC LINE# 72816, 1 PC LINE# 72817, 1 PC</p> <p><i>S wlor / 26</i></p> <p>100% HARDNESS TESTED 44-12 PG 44/45 HRC 2250/11</p> <p>VACUO TH 2250/11</p>					

I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.



METAL TREATING INSTITUTE

Authorized Q.C. Inspector



Accredited
Nadcap
Heat Treating • Welding

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